

ABSTRACT OF THE DISCLOSURE

The present invention, in various embodiments, provides techniques for retiring instructions that typically complete early as compared to most instructions. In a first embodiment, at each stage of the various processing stages, each instruction capable of early retirement is processed in accordance with that stage. At a particular stage, if the instruction meets the criteria for early retirement, then the instruction is terminated, e.g., “retired,” and the system is updated to reflect that the instruction has been terminated. However, if, at that particular stage, the instruction does not meet the criteria for early retirement, then the instruction is processed to the next stage, and it is determined again whether the instruction meets the criteria for early retirement. If the instruction meets the criteria, then the instruction is terminated, or if the instruction does not meet the criteria, then the instruction is processed to the next stage, and so on, until the instruction is retired. In a second embodiment, it is predetermined that early-completion instructions are to be retired at a particular stage. Consequently, all instructions are processed normally and early-completion instructions are retired when they reach that particular stage. For example, early-completion instructions are retired out-of-order after they reach a particular stage in an instruction queue, even though they meet the early-retirement criteria prior to entering the queue. In a third embodiment, early-completion instructions are retired out-of-order when an instruction queue is full. As a result, all instructions are processed normally until the instruction queue is full. At that time, the system is frozen, e.g., all units stop processing instructions. For each instruction in the instruction queue, if the instruction meets the criteria for early retirement, then the instruction is terminated and the system is updated to reflect that the instruction has been terminated. The system is then unfrozen, and all units resume their functions.